Name:

at1121exam_practice: Radicals and Squares (v607)

Question 1

Simplify the radical expressions.

$\sqrt{99}$	$\sqrt{75}$	$\sqrt{8}$
$\sqrt{3 \cdot 3 \cdot 11}$	$\sqrt{5 \cdot 5 \cdot 3}$	$\sqrt{2 \cdot 2 \cdot 2}$
$3\sqrt{11}$	$5\sqrt{3}$	$2\sqrt{2}$

Question 2

Find all solutions to the equation below:

$$4\left((x-7)^2 - 10\right) \;=\; 60$$

First, divide both sides by 4.

$$(x-7)^2 - 10 = 15$$

Then, add 10 to both sides.

$$(x-7)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 7 = \pm 5$$

Add 7 to both sides.

$$x = 7 \pm 5$$

So the two solutions are $x = 12$ and $x = 2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 14x = -40$$

$$x^2 + 14x + 49 = -40 + 49$$
$$x^2 + 14x + 49 = 9$$
$$(x + 7)^2 = 9$$
$$x + 7 = \pm 3$$
$$x = -7 \pm 3$$
$$x = -4 \quad \text{or} \quad x = -10$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 24x + 42$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 8x) + 42$$

We want a perfect square. Halve -8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 8x + 16 - 16) + 42$$

Factor the perfect-square trinomial.

$$y = 3((x - 4)^2 - 16) + 42$$

Distribute the 3.

$$y = 3(x - 4)^2 - 48 + 42$$

Combine the constants to get **vertex form**:

$$y = 3(x - 4)^2 - 6$$

The vertex is at point $(4, -6)$.